

1. Introduction

Human activities have major impacts on the global environment. Mankind has increasingly used land, water, minerals and other natural resources since the beginning of industrialization, and future growth in the population and economy will surely deepen the impact on the environment. As the global climate, biogeochemical processes and natural ecosystems are closely inter-linked, changes in any one of these systems may affect the others and be detrimental to humans and other organisms. Man-made gaseous and particulate matter emitted into the atmosphere alter the energy balance of the atmosphere and, in consequence affect interactions among the atmosphere, hydrosphere and biosphere. Nevertheless, mankind sufficiently understands neither the chemical processes within the atmosphere nor the relationships among the atmosphere, the hydrosphere and the biosphere. The main reason for our lack of understanding about the chemical processes of the atmosphere and the oceans is our lack of observation data.

To promote systematic and reliable observation of the global environment, including greenhouse gases (CO₂, CH₄, CFCs, N₂O, etc.) and other related gases (e.g., CO, NO_x and SO₂) in the atmosphere, the World Meteorological Organization (WMO) started the Global Atmosphere Watch (GAW) programme in 1989. In October 1990, the WMO established the World Data Centre for Greenhouse Gases (WDCGG) at the Japan Meteorological Agency (JMA) in Tokyo as one of the GAW World Central Facilities to collect, archive and distribute data for greenhouse and related gases in the atmosphere and oceans. In August 2002, the WDCGG took over from the Norwegian Institute for Air Research (NILU) the role of the Data Centre for surface ozone and started to collect data from a number of observation sites throughout world which are involved in GAW and other scientific monitoring programmes (Appendix: LIST OF OBSERVING STATIONS).

Since its establishment, WDCGG has provided its users with data and other information through its regular publications: *Data Report*, *Data Catalogue*, *Data Summary* and *CD-ROM* (Appendix: LIST OF WMO WDCGG PUBLICATIONS). All the data and information are now available on the WDCGG web site. This aims at improving accessibility to data, information and products, in line with the Strategy of the Implementation of the Global Atmosphere Watch Programme (2001-2007) published in June 2001 (WMO, 2001).

This Strategy also requests the GAW facilities, including World Data Centres, to build up a data bank that can provide a good analysis in cooperation with the scientific research community. In order to meet this request, the WDCGG has increased its analytical activities, and made the contents of the annual *Data Summary* more comprehensive. Global and integrated analyses used to monitor global changes in concentrations of greenhouse gases have become important tasks of the WDCGG. Other important tasks are to revise and improve the contents of the *Data Summary* based on comments from data contributors and scientists and then to provide scientists

and policy makers with more advanced analytical information. The WDCGG welcomes comments and suggestions concerning the *Data Summary* and its other publications. It is expected that the analytical information presented here will not only stimulate the use of data about greenhouse gases and other gases, but also deepen the appreciation of the value of the GAW programme.

The WDCGG thanks all the data contributors including those involved in the measurement at sites for their efforts in maintaining the observation programme and for continuously providing data.

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Note:

The WDCGG requests the data users to make acknowledgement by citing the contributors and the data sources appropriately when they use any data and information provided by the WDCGG. The data users should refer to the GAW Station Information System (GAWSIS) at the GAW website (http://www.wmo.ch/web/arep/gaw/gaw_home.html) or the WDCGG website for details on the GAW Country Contacts, what measurements are being made and the responsible investigators. The information at the GAWSIS and the World Data Centres is properly updated in cooperation with the WMO Secretariat.